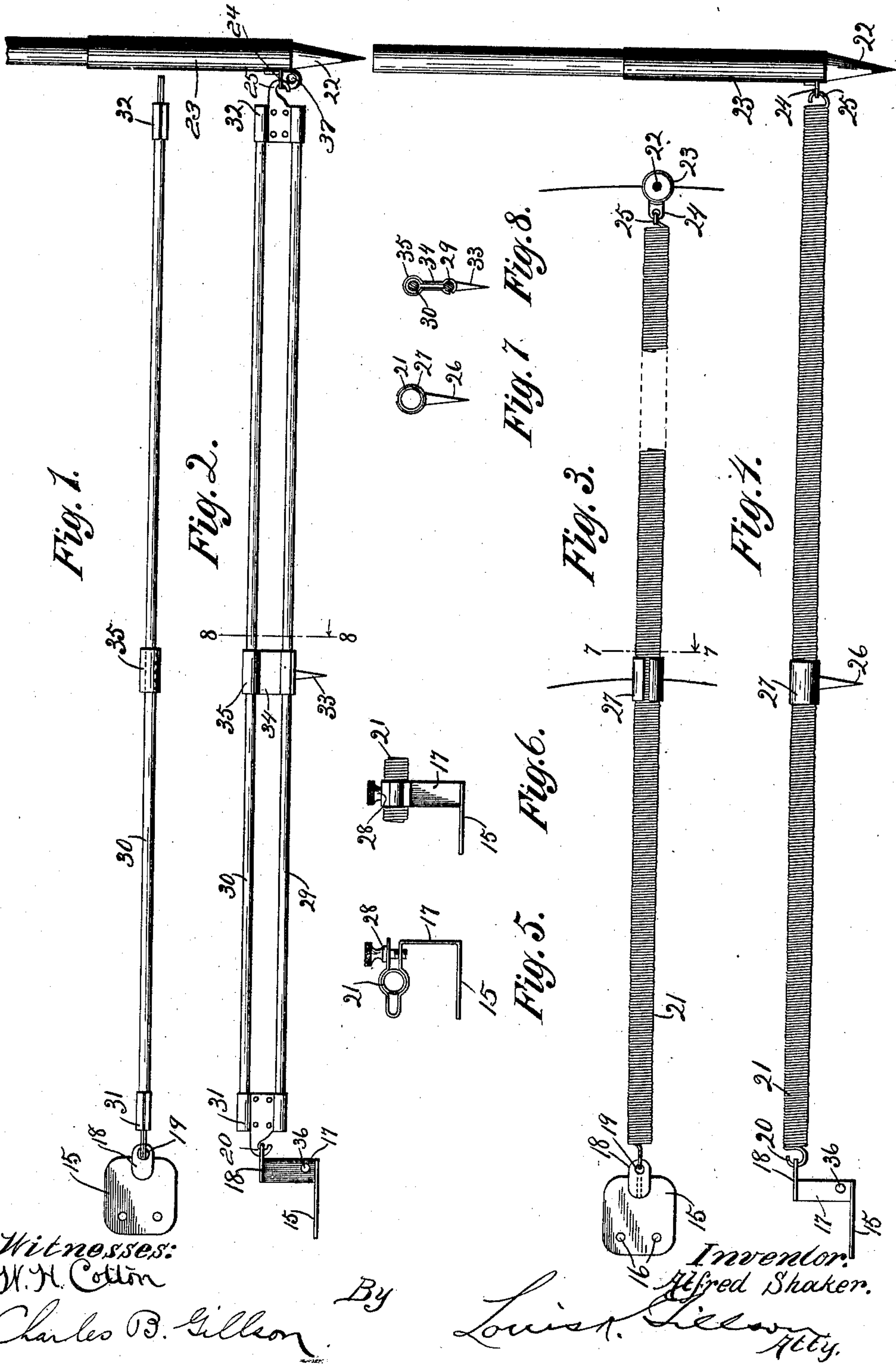


No. 811,333.

PATENTED JAN. 30, 1906.

A. SHAKER.  
PANTOGRAPH.

APPLICATION FILED JUNE 2, 1905.



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# UNITED STATES PATENT OFFICE.

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## PANTOGRAPH.

No. 811,333.

Specification of Letters Patent.

Patented Jan. 30, 1906.

Application filed June 2, 1905. Serial No. 263,487.

*To all whom it may concern:*

Be it known that I, ALFRED SHAKER, a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Pantographs, of which the following is a specification, and which are illustrated in the accompanying drawings, forming a part thereof.

The invention relates to a drafting instrument which may be employed for reproducing from a copy upon a different scale, and more specifically to such a device in which an elastic cord suitably anchored adjacent one of its ends is secured to the drawing-pencil and carries a tracing-point for following the lines of the copy.

The invention consists in the construction and arrangement of parts to be hereinafter described and claimed, and particularly in improved means for preventing the twisting or spinning of the elastic cord, whereby the tracing-point may be made to travel continuously over the copy without such frictional engagement therewith as would interfere with the accurate working of the device, the object of the invention being to provide a pantograph which shall be efficient in operation and of simple and inexpensive construction.

In the accompanying drawings, Figure 1 is a plan view of the device, some of the parts being omitted. Fig. 2 is a side elevation of the same. Fig. 3 is a plan view showing a modified form of the device, some of the parts being broken away. Fig. 4 is a side elevation of the same. Figs. 5 and 6 are a sectional detail and a detail elevation, respectively, showing another modification in the construction; and Figs. 7 and 8 are sectional views on the lines 7 7 of Fig. 3 and 8 8 of Fig. 2, respectively.

An anchor-plate for securing the device in position is shown at 15. It may be attached to a drawing-board in any desired manner, but preferably by means of ordinary thumb-tacks (not shown) passed through the apertures 16. A post 17 rises from the plate 15 and is overturned at the top, as indicated at 18, and provided with an aperture 19 for receiving the hooked end 20 of an elastic cord. To the opposite end of this cord is secured a drawing-pencil 22, as shown in the drawings, a sleeve 23 being provided for receiving the pencil and having near its lower end an aper-

ture ear 24, into which a hook 25, formed on the end of the cord, may be inserted.

In the preferred construction of the device (shown in Figs. 3, 4, and 7 of the drawings) the elastic cord takes the form of a coil-spring 21. A tracing-point 26 for following the delineations of the drawing to be copied is adjustably secured to the spring intermediate its ends and depends therefrom substantially to the plane of the drawing-board. It is provided with a shank 27, which preferably takes the form of a split tube adapted to frictionally engage the body of the spring.

It may be desirable in some cases—as, for example, when the device is to be used indiscriminately for reproducing drawings of various sizes—to provide means for adjusting the length of the spring 21. There may be employed for this purpose the form of construction shown in Figs. 5 and 6, in which a clamp 28 for gripping the spring at any desired point is formed at the top of the post 17.

In Figs. 1, 2, and 8 the elastic cord is shown as composed of two strands 29 30, preferably of rubber or elastic fabric and of equal length. The ends of both of these strands are secured to suitable cleats 31 32, upon which the hooks 20 and 25 for engaging the anchor-plate 15 and the drawing-pencil 22 are formed, respectively. A tracing-point (shown at 33) is suspended from the elastic cord, it being preferably carried by but one of the strands, as 29, the other strand serving merely to prevent the overturning of the tracing-point by the twisting of the strand to which it is secured. To this end the tracing-point 33 is provided with a shank 34, adapted to frictionally engage the strand 29 and having a tubular eye 35 for loosely receiving the strand 30, as most clearly shown in Fig. 8.

In using the device the drawing to be copied and the paper upon which the reproduction is to be made are secured to the drawing-board within the range of the tracing-point 26 or 33 and the drawing-pencil 22, respectively, when the elastic cord is moderately strained. An accurate reproduction of the copy may then be drawn by so guiding the pencil that the tracing-point follows the lines of the original, for while the length of the cord may change as the pencil is moved about the ratio between the distances from the anchor-plate 15 to the tracing-point and to the drawing-pencil remains uniform throughout the operation. The scale of re-



production may be changed by shifting the position of the tracing-point upon the cord, it being larger when the tracing - point is placed nearer to the anchor-block 15.

5 As shown in the several figures of the drawings, the tracing-point is intended to be supported in a vertical position over the original. It may, however, be made to lie flat upon the drawing-board by inserting the hooked end  
10 20 of the elastic cord in an aperture 36, provided in the vertical portion of the post 17 near its base.

It will be understood that by the use of a coil - spring which does not twist when  
15 strained or by the use of the cord of elastic fabric constructed according to my invention I am enabled to support the tracing-point in a convenient position for use without the employment of any means to support or  
20 guide it which drag upon the surface of the drawing to be copied.

In order that the tracing-point 33 may be used in the horizontal position previously described when the form of elastic cord illustrated in Figs. 1, 2, and 7 is employed, a ver-  
25 tically - extended apertured lug 37 may be provided on the pencil-holder 23 for receiving the hook 25.

I claim as my invention—

30 1. In a pantograph, in combination, an an-

chor; a pencil-holder; a coil-spring having each of its ends connected respectively to one of such parts, one of the connections being adapted to prevent the rotation of the spring; and a tracing-point carried by the spring. 35

2. In a pantograph, in combination, an anchor; a pencil-holder; a coil-spring having each of its ends connected respectively to one of such parts, one of the connections being adapted to prevent the rotation of the spring; 40 a clip for frictionally engaging the spring; and a tracing-point carried by the clip.

3. In a pantograph, in combination, an anchor; a pencil-holder; a longitudinally-elastic connecting member; a tracing-point carried by the elastic member; and hook-and-eye connections for the elastic member with the anchor and pencil-holder, such connections being disposed to impart the desired direction to the tracing-point. 50

4. In a pantograph, in combination, an anchor, a pencil-holder, a coil-spring connecting such parts, the connection between the spring and one of the parts being by means of a hook and eye, and a tracing-point carried by the spring. 55

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